

IAF SPACE SYSTEMS SYMPOSIUM (D1)  
Space Systems Engineering - Methods, Processes and Tools (2) (4B)

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MAINTAINING SPACE SYSTEM CONSISTENCY WITH SINGLE POINT OF TRUTH AND  
INTEGRATED SIMULATION IN A TEST-DRIVEN-DEVELOPMENT-INSPIRED APPROACH

**Abstract**

One of the major problems in virtually all projects relying on distributed teams, is being able to easily verify the consistency of design parameters across the whole project. Using inconsistent parameters often leads to risks, costs, delays and frustration when they eventually have to be resolved somewhere down the line. Sometimes these inconsistencies can have fatal outcomes as seen with the Mars Climate Orbiter which crashed on Mars because of inconsistent use of metric and imperial system. Issues like that can be easily avoided using a system that continuously verifies and checks all parameters that are entered or updated.

This paper describes the collaboration between Telespazio VEGA and Valispace, who together designed such a system. Valispace provides a solution for a single point of truth within design projects. Telespazio VEGA has decades of knowledge in simulation especially in the space domain. Combining both expertise culminates in a methodology and tools that can act as an integrated solution that not only manages key parameters but also runs simulations to verify that changes to the configuration still result in a valid system.

The paper will go into detail how taking lessons learnt from test driven software engineering approaches and applying them to generic system engineering problems can alleviate most issues with inconsistencies, essentially providing lightweight regression testing of the complete system. It will describe how this integrated, automatic solution can benefit the system development.

Being aware of the system validity and having problems visible at all times, will ensure that the integration of different parts will function seamlessly and in turn reduce risks, costs and time. Automating numerous tasks, like the requirement verification, document generation and continuous simulations and tests can remove the primary sources of errors within a project.